Remarks

The Applicants respectfully request reconsideration in view of the foregoing amendments and following remarks. Claims 1, 4, 5, 7-12, 14-22, 25-28, 31-33, 68, 69, 72, 73 and 76-98 are pending, of which claims 1, 22, 28, 68, 77, 84, 88 and 92 are independent. Claims 2, 3, 6, 13, 23, 24, 29, 30, 34-67, 70, 71, 74 and 75 have been canceled without prejudice. No claims have been allowed.

Interview Summary

The Applicants thank Examiner Werner for telephoning on June 18, 2009, to discuss the present application. No exhibit was shown, and no demonstration was conducted. Examiner Werner and the undersigned attorney discussed claim 1 of the application, U.S. Patent No. 5,668,547 to Lee, and differences between run-length coding and run-level coding. No agreement was reached as to the allowability of the claims, but the undersigned attorney agreed to consider additional amendments to the claims.

Examiner Werner and the undersigned attorney also discussed whether the claims satisfy 35 U.S.C. § 101. Examiner Werner suggested specific changes to the computer-readable medium claims but indicated the method claims satisfy 35 U.S.C. § 101.

Rejections of Claims 77-98 Under 35 U.S.C. § 101

In the final Office action, the Examiner rejects claims 77-98 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Final Office action, pages 4-5. The Applicants respectfully disagree with the rejections. To expedite prosecution, however, the Applicants have amended claims 77-98 as suggested by the Examiner. *See* final Office action, pages 2, 5.

The rejections of claims 77-98 under 35 U.S.C. § 101 should be withdrawn. Such action is respectfully requested.

Cited Art

In the final Office action, the Examiner cites U.S. Patent No. 4,420,771 to Pirsch ("Pirsch patent") and U.S. Patent No. 5,668,547 to Lee ("Lee patent").

Rejections of Claims Under 35 U.S.C. § 103

In the final Office action, the Examiner rejects claims 1, 4, 5, 7-12, 14-22, 25-28, 31-33, 68, 69, 72, 73 and 76-98 under 35 U.S.C. § 103 as being unpatentable over the Pirsch patent in view of the Lee patent. The Applicants respectfully disagree but have amended the claims to expedite prosecution. In particular, the Applicants have amended independent claims 1, 22, 77 and 84 to add detail about run-level encoding (or decoding) of first-layer run information. Similarly, the Applicants have amended independent claims 28, 88, 68 and 92 to add detail about run-level encoding (or decoding) of first-layer level information.

<u>Independent Claims 1 and 77</u>

Each of claims 1 and 77, as amended, recites:

> run-level encoding the sequence of values as a sequence of plural first-layer run-level pairs that include plural first-layer runs and plural first-layer levels; and
>
> run-level encoding a sequence of the plural first-layer runs as a sequence of one or more second-layer run-level pairs, wherein each of the one or more second-layer run-level pairs includes a second-layer run and a second-layer level, the second-layer run representing a count of consecutive first-layer runs classified as having an insignificant run value, and the second-layer level representing a single adjacent first-layer run classified as having a significant run value.

The Pirsch patent and the Lee patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 1 and 77. In the final Office action, the Examiner acknowledges that the Pirsch patent does not disclose "performing second-layer run-level coding on runs." Final Office action, page 6. The Examiner then opines that the Lee patent "teaches that it was known to perform run-level coding as an efficient variable-length coding technique and that it was known to further compress a first-layer run-level code." Final Office action, pages 6-7. Even if the Pirsch patent and Lee patent are combined as proposed by the Examiner, however, the combination still fails to teach or suggest the above-cited language of claims 1 and 77.

The Applicants acknowledge that the Lee patent describes run-level encoding that is followed by further encoding of the run values from the run-level encoding. In particular, from a series of run-level pairs (the results from initial run-level encoding), the further encoding of the Lee patent represents the runs by iteratively using (a) a number of repeated runs of the same

value and (b) that value of the repeated runs. Consider the following example, which is based on 4:14-36 of the Lee patent. Run-level encoding of the sequence of values:

0, 8, 0, 6, 0, -4, 0, 3, 0, -1, 1, -1, 0, 0, -2, 0, 0, 6, 0, 0, 1, 0, 0, 1....

yields the run-level pairs:

(1,8), (1,6), (1,-4), (1,3), (1,-1), (0,1), (0,-1), (2,-2), (2,6), (2,1), (2,1)....

The first five run-level pairs (1,8), (1,6), (1,-4), (1,3), (1,-1) have the same run of 1, where a run of 1 indicates a run of a single 0 value in the initial sequence. These five run-level pairs are encoded as (5, 1, 8, 6, -4, 3, -1), where 5 is the number of consecutive run-level pairs having the same run, and 1 is the value of the runs in the five run-level pairs.

The next two run-level pairs (0,1), (0,-1) have the same run of 0, each indicating a run of no 0 values in the initial sequence. These two run-level pairs are encoded as (2, 0, 1, -1), where 2 is the number of consecutive run-level pairs having the same run, and 0 is the value of the runs.

The final four run-level pairs (2,-2), (2,6), (2,1), (2,1) have the same run of 2, each 2 indicating a run of two 0 values in the initial sequence. These four run-level pairs are encoded as (4, 2, -2, 6, 1, 1), where 4 is the number of consecutive run-level pairs having the same run, and 2 is the value of the runs in the four run-level pairs.

Even if the Lee patent describes further encoding of the runs of run-level pairs, such further encoding still does not teach or suggest the above-cited language of claims 1 and 77. According to claims 1 and 77, a sequence of first-layer runs is encoded as "one or more second-layer run-level pairs," where each second-layer pair includes a "second-layer run" and a "second-layer level." The second-layer run represents "a count of consecutive first-layer runs classified as having an *insignificant run value*." The second-layer level represents "a single adjacent first-layer run classified as having a *significant run value*." In example implementations, the insignificant run value is zero, a significant run value is non-zero, and recognition of significant run values and insignificant run values helps represent run values with fewer symbols in many situations. For example, run-level coding of the sequence of values:

8, 6, -4, 3, 0, -1, 1, -1, -2, 0, 0, 6...

yields the following run-level pairs:

(0,8), (0,6), (0,-4), (0,3), (1,-1), (0,1), (0,-1), (0,-2), (2,6)....

The first four run-level pairs (0,8), (0,6), (0,-4), (0,3) have the same run value of 0, which is an example insignificant run value. These four run-level pairs are followed by the run-level

pair (1, -1). The runs for these five run-level pairs are encoded as (4, 1), where 4 is the count of consecutive run-level pairs with the insignificant run value, and 1 is the single subsequent significant run value. Similarly, the runs of the next four run-level pairs (0,1), (0,-1), (0,-2), (2,6) are encoded as (3, 2). Due to the recognition of significant run values and insignificant run values, the first-layer runs are represented with four values. (Further encoding of level values of the run-level pairs is not shown.)

In contrast, for the immediately preceding example, the further encoding of the Lee patent would explicitly represent the count and run value for each group of runs: (4, 0, 8, 6, -4, 3), (1, 1, -1), (3, 0, 1, -1, -2), (1, 2, 6). The underlined values represent the first-layer runs as counts and run values. No counts or run values are implied; the first-layer runs are instead represented with eight values. The further encoding of run values in the Lee patent, which fails to recognize significant run values and insignificant run values, is different than, and leads away from, the above-cited language of claims 1 and 77.

The Pirsch patent fails to remedy this deficiency of the rejection. Even if, for the sake of argument, the Pirsch patent discloses coding/decoding that uses runs and levels, the Pirsch patent at most discloses further *variable length* coding/decoding of the run and level information. *Variable length* coding of run/level information is different than, and leads away from, the above-cited language of claims 1 and 77.

For at least this reason, claims 1 and 77 should be allowable.

Dependent Claims 4, 5, 7-12, 20, 21, 69 and 78-83

Each of dependent claims 4, 5, 7-12, 20, 21, 69 and 78-83 depends from claim 1 or 77 and, for at least that reason, should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Independent Claims 22 and 84

Each of claims 22 and 84, as amended, recites:

> run-level decoding a sequence of one or more second-layer run-level pairs that represent a sequence of plural first-layer runs, wherein each of the one or more second-layer run-level pairs includes a second-layer run and a second-layer level, the second-layer run representing a count of consecutive first-layer runs classified as having an insignificant run value, and the second-layer level

representing a single adjacent first-layer run classified as having a significant run value; and

        run-level decoding the plural first-layer runs and plural first-layer levels to reconstruct the sequence of frequency transform coefficients.

In general, claims 22 and 84 are directed to "run-level decoding" functionality that mirrors the "run-level encoding" functionality of claims 1 and 77. For at least the reasons explained above with reference to the "second-layer run" and "second-layer level" language of claims 1 and 77, the Pirsch patent and Lee patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 22 and 84, respectively. Claims 22 and 84 should be allowable.

Dependent Claims 25-27, 72 and 85-87

Each of dependent claims 25-27, 72 and 85-87 depends from claim 22 or 84 and, for at least that reason, should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Independent Claims 28 and 88

Each of claims 28 and 88, as amended, recites:

        run-level encoding the sequence of frequency transform coefficients as a sequence of plural first-layer run-level pairs that include plural first-layer runs and plural first-layer levels; and

        run-level encoding a sequence of the plural first-layer levels as a sequence of one or more second-layer run-level pairs, wherein each of the one or more second-layer run-level pairs includes a second-layer run and a second-layer level, the second-layer run representing a count of consecutive first-layer levels classified as having an insignificant level value, and the second-layer level representing a single adjacent first-layer level classified as having a significant level value.

The Pirsch patent and the Lee patent, taken separately or in combination, fail to teach or suggest the above-cited language of claims 28 and 88.

The Lee patent describes run-level encoding that is followed by further encoding of the run values of run-level pairs from the run-level encoding. *Level values* from the run-level encoding are not further run-level encoded or run-length encoded according to the Lee patent. The Lee patent fails to teach or suggest "run-level encoding a sequence of the plural first-layer

levels as a sequence of one or more second-layer run-level pairs" as recited in claims 28 and 88. The Lee patent is even further from teaching or suggesting a second-layer run that represents "a count of consecutive first-layer levels classified as having an insignificant level value," or a second-layer level that represents "a single adjacent first-layer level classified as having a significant level value," as recited in claims 28 and 88.

The Pirsch patent fails to remedy these deficiencies of the rejections. Even if, for the sake of argument, the Pirsch patent discloses coding/decoding that uses runs and levels, the Pirsch patent at most discloses further *variable length* coding/decoding of the run and level information. *Variable length* coding of run/level information is different than, and leads away from, the above-cited language of claims 28 and 88.

For at least these reasons, claims 28 and 88 should be allowable.

Dependent Claims 31-33, 73 and 89-91

Each of dependent claims 31-33, 73 and 89-91 depends from claim 28 or 88 and, for at least that reason, should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Independent Claims 68 and 92

Each of claims 68 and 92, as amended, recites:

> run-level decoding a sequence of one or more second-layer run-level pairs that represent a sequence of plural first-layer levels, wherein each of the one or more second-layer run-level pairs includes a second-layer run and a second-layer level, the second-layer run representing a count of consecutive first-layer levels classified as having an insignificant level value, and the second-layer level representing a single adjacent first-layer level classified as having a significant level value; and
> run-level decoding plural first-layer runs and the plural first-layer levels to reconstruct the sequence of values.

In general, claims 68 and 92 are directed to "run-level decoding" functionality that mirrors the "run-level encoding" functionality of claims 28 and 88. For at least the reasons explained above with reference to the "run-level encoding a sequence of the plural first-layer levels as a sequence of one or more second-layer run-level pairs," "second-layer run" and "second-layer level" language of claims 28 and 88, the Pirsch patent and Lee patent, taken

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separately or in combination, fail to teach or suggest the above-cited language of claims 68 and 92, respectively. Claims 68 and 92 should be allowable.

Dependent Claims 14-19, 76 and 93-98

Each of dependent claims 14-19, 76 and 93-98 depends from claim 68 or 92 and, for at least that reason, should be allowable. The Applicants will not belabor the merits of the separate patentability of these dependent claims.

Conclusion and Request for Interview

All pending claims should be allowable. Such action is respectfully requested. Should any issues remain, the Applicants invite the Examiner Werner to telephone the undersigned attorney at the number given below.

Respectfully submitted,

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